



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/628,991

07/29/2003

Mau-Song Chou

NGC-00089 (000342-804)

7348

7590

06/21/2006

John A. Miller  
Warn, Burgess & Hoffmann, P.C.  
P.O. Box 70098  
Rochester Hills, MI 48307

EXAMINER

GAKH, YELENA G

ART UNIT

PAPER NUMBER

1743

DATE MAILED: 06/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/628,991	<b>Applicant(s)</b> CHOU, MAU-SONG	
	<b>Examiner</b> Yelena G. Gakh, Ph.D.	<b>Art Unit</b> 1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 July 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 4, 13 and 15-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-12 and 14 is/are rejected.
- 7) ☒ Claim(s) 2 and 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>7/29/03, 7/19/04, 10/28/05</u> | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-14, drawn to a system for detecting and analyzing chemical and/or biological aerosols, classified in class 422, subclass 82.05.
  - II. Claims 15-20, drawn to a method for detecting and analyzing chemical and/or biological aerosols, classified in class 436, subclass 164.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus can be used for conventional FTIR analysis of gaseous compounds, rather than aerosols.

Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

2. This application contains claims directed to the following patentably distinct species: a spectral imager (claims 4 and 13) and the spectrometer selected from the group consisting of FTIR and other types of spectrometers recited in claims 3 and 12. The species are independent or distinct because these spectrometers have different structure and capabilities and require a different search.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claims 1 and 8 are generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon,

Art Unit: 1743

including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

3. During a telephone conversation with John A. Miller on 06/14/06 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-14, of which species recited in claims 3 and 12 was elected. Affirmation of this election must be made by applicant in replying to this Office action. Claims 15-20 and 3, 13 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### *Specification*

4. The specification is objected to because of the following informalities: a, on page 6 the full name for "BG aerosol" should be provided; b, on page 8 the sentence "the radiation energy absorbed by the water vapor, the oxygen molecules or the target molecules in the cloud 12 is thermalized as a result of collision energy transfer causing inter-molecular relaxation" is not clear. What the radiation energy mentioned in the beginning of the sentence refers to in the rest of the sentence? What specifically is thermalized?

The statement on page 3, "there is currently no suitable method known in the art that is quick and accurate for the detection and analysis of liquid chemical or biological aerosols" needs to be specified, since a remote detection of vapor clouds, which does not significantly differ from the detection of aerosol clouds, was known at least since 1994 (see e.g. Fee, US 5,294,796; Beil et al., Proceed. SPIE, 1998 and references therein), and detection of aerosols in test chambers was known since at least 1990 (Michaelis et al., US 4,943,161). Also, the examples in the instant application refer to solid, rather than liquid aerosols.

### *Claim Objections*

5. Claims 2 and 11 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to

Art Unit: 1743

cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. A spectrum analysis device recited in claims 1 and 8 is a spectrometer. The examiner is not aware of any other device, which can analyze spectra. A "spectrometer" by definition is an apparatus for measuring and analyzing spectra.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-3, 5-12 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites "a sample cloud in the air". It is not clear, at which distance the sample cloud is located relative to the radiation source and the spectrum analyzer device, which is essential for the structural arrangement of the system? This leads to indefiniteness in the structural arrangement of the system recited in claims 1-3 and 5.

Further, it is not clear, if claim 1 recites *any* radiation source and *any* spectrum analysis device? In fact, any radiation source is capable of heating a sample cloud, and any spectrum analyzer is capable of detecting "emission spectrum" resulted from excitation of different energy levels in the sample molecules related to specific excitation wavelength range. This "emission spectrum" may have nothing to do with the infrared wavelength range. This non-clarity of specific relation between the radiation source and the spectrum analysis device renders claims 1-3 and 5-7 unclear and indefinite. It is also unclear if the radiation source and the spectrum analysis device are physically or optically connected.

The same problem exists for claims 8-12, 14.

Further, claim 8 recites "a spectrum analysis device positioned relative to the first end of the chamber". It is not clear as to *how* it is positioned relative to the first end of the chamber. Is it positioned close to the first end of the chamber? Far from the first end of the chamber? The expression "positioned relative" does not define a distance.

From claim 10 it is completely unclear as to how the powder is related to the aerosol of the parent claim.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. **Claims 1-3 and 5-7** are rejected under 35 U.S.C. 102(b) as being anticipated by Taylor (US 5,373,160).

Taylor discloses: “as shown in FIG. 1, the hazardous air pollutants monitor 35 according to the invention comprises four main components. These are a **CO<sub>2</sub> laser 22**, a nonlinear crystal or doubler 42, a receiver 44 including an acousto-optic tunable filter 46, and a computer 48 for analyzing collected data and for controlling system operation. Preferably, these elements are coupled optically using a **beam expander 52**, a gimballed turning mirror 54, and a **directable receiving telescope 56**. The laser 22 and beam expander 52 direct illumination along the beam path 80, and are mounted commonly with the telescope 56 to illuminate and view along a common path between the measuring system 35 and a remote topographic target. The telescope 56 focuses light from the sample on at least one, and preferably two detectors 62, 64. The detectors, which may be point detectors, line arrays, or focal plane arrays, can include a **7-14 μm detector 62** and a **3.5-7 μm detector 64**, which are operated selectively in conjunction with control of the illumination wavelength selected by the laser output means, generally designated 76. The detectors 62, 64 are controllably coupled to an electronic controller, preferably provided

as a function of **computer 48**, that sequences system operation and analyzes the collected data to decode the measurement results” (col. 6, lines 15-39).

10. **Claims 1-3 and 5-7** are rejected under 35 U.S.C. 102(b) as being anticipated by Childers et al. (Atmos. Env., 2001) as evidenced by Taylor.

Childers teaches “multi-pollutant concentration measurements around a concentrated swine production facility using open-path FTIR spectrometry” (Title). “Spectral data were collected with an AIL Systems, Inc. RAM 2000 Remote Air Monitoring System. In this monostatic OP/FTIR monitor, the spectrometer module contains an IR source, detector, interferometer, transmitting/receiving telescope, external beamsplitter, and associated electronics”. While Childers does not specify IR source, CO<sub>2</sub> lasers are conventional IR sources for OP/FTIR systems, as evidenced by Taylor.

11. **Claims 1-3 and 5** are rejected under 35 U.S.C. 102(b) as being anticipated by Fee (US 5,294,796).

Fee discloses “remote vapor detection system and method thereof”. “As shown in Fig. 2, a vapor detection system 10 of the present invention comprises a laser 12, a wavelength selective receiver 14, a 45 degrees oriented mirror 16 that is provided with a centrally located aperture. Mirror 16 is positioned between the laser 12 and the background surface 20 which is immediately behind and adjacent to a vapor cloud 22, the contents of which are to be detected by the present invention. A second 45 degree oriented mirror 18 is positioned adjacent the optical entrance of the infrared receiver 14” (col. 5, lines 18-28).

12. **Claims 1-3 and 5** are rejected under 35 U.S.C. 102(e) as being anticipated by the prior art disclosed in Johnson (US 2004/0211900) as evidenced by Taylor.

In Background of the Invention Johnson discloses various FTIR spectroscopic systems for active and passive remote analysis of gases in atmosphere, with active systems comprising an active source of IR radiation, a telescope for collimating the radiation, and IR detection system with necessity of co-alignment of the IR sender and receiver telescopes (col. 1, and 2, paragraphs [003] and [004]). Although Johnson does not specify using lasers, specifically CO<sub>2</sub> laser as active sources, they are notoriously well known in the art of active remote FTIR detection, see e.g. Taylor above. Therefore, Johnson could have mentioned CO<sub>2</sub> laser as a known IR source in remote FTIR analysis.

Art Unit: 1743

13. **Claims 8-9 and 11-12** are rejected under 35 U.S.C. 102(e) as being anticipated by Samuels et al. (Proceed., 2001, IDS).

Samuels discloses a system for “infrared spectral study of aerosolized ovalbumin and aerosolized *Bacillus subtilis* and *Bacillus thuringiensis* spores” (Title), comprising a rectangular aerosol chamber with a ZnSe window on one side with MIDAC FTIR spectroradiometer and a blackbody radiation source for heating the sample.

### ***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

16. **Claims 1-3 and 5-7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Thériault et al. (Pure Appl. Opt., 1998) .

Thériault teaches “remote monitoring of cloud parameters from ground-based FTIR measurements” (Title) using DREV (Defense Research Establishment Valcartier) Fourier spectrometer DBIS (double-beam interferometer sounder). “Essentially, DBIS is made of one or, optionally two 10 in diameter Cassegrain telescopes optically coupled to a double-input-port Fourier transform spectrometer and two detection units (output optics 1 and 2). Figure 1 summarizes the design of the instrument” (page 890). While Thériault discloses the system for



Art Unit: 1743

passive FTIR analysis, active FTIR analysis involves using IR source such as CO2 lasers, and therefore it would have been obvious for any person of ordinary skill in the art to modify Thériault or passive FTIR systems by incorporating laser IR source for active FTIR detection and analysis.

17. **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over Samuels in view of Ho (US 4,710,887) or Carlon et al. (US 4,568,190).

Samuels does not specifically disclose a fan in the chamber.

Ho discloses a small electric fan 20 housed with the chamber 10 to distribute the aerosol within the chamber (Figure 1, col. 2, lines 7-9) and Carlon discloses a rotary gab 20 for homogenous spreading of the aerosol particles in the chamber (Figure 1).

It would have been obvious for any person of ordinary skill in the art to introduce the fan disclosed by Ho or Carlon in Samuels's system for more homogenous distribution of the aerosol particles in the chamber.

18. **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over Samuels in view of Taylor.

While Samuels discloses the black body source for the sample excitation, lasers recited in the claim are conventional sources for IR wavelength range, as indicated by e.g. Taylor, and therefore would be conventionally used by any routineer in the art in Samuels's system, if more specific wavelength range were required for analysis of other analytes.

### ***Double Patenting***

19. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re*

Art Unit: 1743

*Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3 and 5-7 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Patent No. 6,531,701. Although the conflicting claims are not identical, they are not patentably distinct from each other because US 6,531,701 discloses all components of the present invention, i.e. a radiation source selected from the group consisting of microwave, millimeter wave, infrared, visible and ultraviolet radiation; receiving detector selected from the group of FTIR spectrometers, acousto-optic spectrometers and dispersion spectrometers; a telescope responsive to the emission from the cloud, with IR sender telescopes notoriously well known in the art, as evidenced by e.g. Johnson above.

### ***Conclusion***

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. *Harig et al. (Field Anal. Chem. Technol., 2001)* and references therein disclose "toxic cloud imaging by infrared spectrometry: a scanning FTIR system for identification and visualization" (Title). In Introduction Harig discloses: "remote sensing by infrared spectrometry is a well-established method for the identification and quantification of gases and vapors in the atmosphere. The method us used in a variety of different applications, such as the measurement of the composition and vertical profile of the atmosphere, the composition of volcanic gases, the analysis of smokestack emissions, and the analysis of aircraft jet engine exhaust gas. In the case of chemical accidents, terrorism, or war, hazardous compounds are often released into the atmosphere. Various Fourier-transfer, infrared (FTIR) spectrometers have been developed for the detection and identification of these hazardous clouds. ... Imaging spectrometers with high spatial resolution based on FLIR detector system combined with a tunable filter such as an

Art Unit: 1743


acousto-optical filter or a tunable etalon have been developed; *Ben-David (Optics Express, March 2003)* teaches "remote detection of biological aerosols at a distance of 3 km with a passive Fourier transform infrared (FTIR) sensor"; *Ben-David et al. (Applied Optics, August 2003)* teach "detection, identification, and estimation of biological aerosols and vapors with a Fourier-transfer infrared spectrometer".

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yelena G. Gakh, Ph.D. whose telephone number is (571) 272-1257. The examiner can normally be reached on 9:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

6/15/06

  
**YELENA GAKH**  
**PRIMARY EXAMINER**